APPENDIX C

OPERATIONS IN NUCLEAR, BIOLOGICAL, AND CHEMICAL CONDITIONS

The purpose of using nuclear, biological, and chemical weapons is the same as for any other weapons: to produce casualties, destroy or disable equipment, and disrupt the enemy's operations. Chemical and biological agents and nuclear weapons may be employed separately or together and normally supplement conventional weapons. Planning must routinely address the use of each of these as well as protective measures against enemy NBC weapons.

Section I. NUCLEAR, BIOLOGICAL, CHEMICAL BATTLEFIELD

The integration of NBC weapons and contamination caused by industrial incidents into tactical operations is described as the NBC-contaminated battlefield.

C-1. COMMAND

The task force commander prepares his units and personnel to operate in an NBC environment. To do this, he ensures the battalion task force takes the proper protective measures, including--

- NBC vulnerability analysis.
- Dispersion and use of terrain as shielding.
- Continuous NBC monitoring with detection equipment.
- Assumption of the appropriate MOPP level.

C-2. STAFF

For NBC operations, the battalion task force chemical officer provides technical advice to the TF commander and the remainder of the TF staff. The NBC staff officer--

- Templates strikes and develops predictions on the effects of enemy NBC weapons on TF operations in conjunction with the S2.
- Disseminates information received via the NBC warning and reporting system (NBCWRS).
- Recommends reconnaissance, monitoring, and surveying requirements.
- Recommends MOPP and operational exposure guidance based on the S2's threat analysis and higher headquarters guidance.
- Maintains records of unit contamination to include radiological dose records.
- Conducts vulnerability analysis of unit positions.
- Plans TF decontamination operations in conjunction with the S3.
- Coordinates for nonorganic NBC assets (decontamination, smoke, and reconnaissance) support.
- Acts as the liaison between attached chemical units and the S3.

C-3. CHARACTERISTICS OF CHEMICAL AGENTS

Chemical agents cause casualties, degrade performance, slow maneuver, restrict terrain, and disrupt operations (Table C-1). They can cover large areas and may be delivered as liquid, vapor, or aerosol and disseminated by artillery, mortars, rockets, missiles, aircraft spray, bombs, land mines, and covert means.

AGENT	Nerve	Blood	Blister	Choking
PROTECTION	Mask and BDO	Mask and BDO	Mask	Mask
DETECTION	M8A1, M256A1, CAM, M8 and M9 paper	M256A1, CAM, M8 and M9 paper	M256A1	Odor (freshly mowed hay)
SYMPTOMS	Difficult breathing, drooling, nausea, vomiting, convulsions, and blurred vision	Burning eyes, stinging skin, irritated nose	Convulsions and coma	Coughing, nausea, choking, headache, and tight chest
EFFECTS	Incapacitates	Blisters skin, damages respiratory tract	Incapacitates	Floods and damages lungs
FIRST AID	Mark 1 NAAK	As for 2d and 3d degree burns	None	Keep warm and avoid movement
DECON	M291 and flush eyes with water	M291 and flush eyes with water	None	None

Table C-1. Characteristics of chemical agents.

C-4. CHARACTERISTICS OF BIOLOGICAL AGENTS

a. **Toxins.** Toxins are poisonous substances produced from living organisms. The following are characteristics of toxins:

- Can be synthesized (artificially produced).
- Mirror the symptoms of nerve agents.
- Present 8-12 hours of tactical concern (some are changed by sunlight).
- Can be fast acting (neurotoxins) or slower acting (cytotoxins).

b. **Pathogens.** Pathogens are infectious agents that cause disease in man and animals, such as bacteria, viruses, and rickettsiae. The following are characteristics of pathogens:

- Delayed reaction (incubation 1-21 days).
- Multiply and overcome natural defenses.
- Inhalation is the primary mode of exposure.

c. **Protection from Biological Agents.** The following offer protection against biological agents:

- Up-to-date immunizations.
- Good hygiene.
- Area sanitation.
- Physical conditioning.
- Water purification.
- Food sanitation
- Use of chemoprophylaxis as directed.

C-5. NUCLEAR WEAPONS EFFECTS

Nuclear weapons are much more destructive than conventional weapons. Blast, nuclear and thermal radiation, and electromagnetic pulse are of primary concern.

a. **Blast.** High-pressure shock wave crushes structures and causes missiling damage.

b. **Thermal Radiation.** Intense heat and extremely bright light causes burns, temporary blindness, and dazzle.

c. **Nuclear Radiation.** Energy released from a nuclear detonation produces fallout in the form of initial and residual radiation, both of which cause casualties.

d. **Electromagnetic Pulse.** Surge of electrical power occurs within seconds of a nuclear detonation and damages electrical components in equipment (radios, radar, computers, and vehicles) and weapon systems (TOW, Javelin, and Dragon).

e. **Protection from Nuclear Attack.** Cover/shielding offers the best protection from the immediate effects of a nuclear attack. This includes cover in fighting positions, culverts, and ditches. Soldiers should cover exposed skin and stay down until the blast wave passes and debris stops falling. Immediately after a nuclear attack, begin continuous radiation monitoring.

f. **Monitoring.** FM 3-3 describes monitoring techniques, correlation factor data, and recording forms. Monitoring may be periodic or continuous.

(1) ***Periodic*.** Units conduct periodic monitoring during nuclear warfare. All units routinely (at least once an hour) monitor a designated point in their respective areas. The NBC defense annex of the unit SOP gives detailed guidance on monitoring procedures.

(2) ***Continuous*.** All units initiate continuous monitoring when they receive a fallout warning, when a unit is on an administrative or tactical move, when a nuclear burst occurs, when radiation levels above one centigray (cGy) per hour are detected by periodic monitoring, and on order of the commander. Continuous monitoring stops on instructions from the commander or higher headquarters or when the dose rate falls below one cGy per hour (except for units on the move).

g. **Operational Exposure Guidance.** Operations in a nuclear environment are complicated by the necessity to control exposure of personnel to nuclear radiation. An OEG determines the maximum radiation dose to which units may be exposed and still accomplish a mission. Determination of this dose is based on the accumulated dose or radiation history of the unit.

Section II. TENETS OF NUCLEAR, BIOLOGICAL, AND CHEMICAL DEFENSE

Protect the force by adhering to three tenets of NBC defense: contamination avoidance, protection, and decontamination.

C-6. CONTAMINATION AVOIDANCE

Avoiding NBC attacks and hazards is the key to NBC defense. Avoidance allows commanders to shield soldiers and units.

a. **Active and Passive Measures.** Contamination avoidance involves both active and passive measures. Passive measures include training, camouflage, concealment, hardening positions, and dispersion. Active measures include detection, reconnaissance, alarms and signals, warning and reporting, marking, and contamination control.

b. **NBC Reconnaissance.** NBC reconnaissance is the detection, identification, reporting, and marking of NBC hazards. NBC reconnaissance consists of search, survey, surveillance, and sampling operations. Due to limited availability of the M93 FOX reconnaissance vehicle, consider alternate means of conducting NBC reconnaissance (such as scouts, MPs, engineers, and maneuver units). As a minimum, consider the following actions when planning and preparing for NBC reconnaissance:

- Use the IPB process to orient on NAIs.
- Pre-position reconnaissance assets to support requirements.
- Establish command and support relationships.
- Assess the time and distance factors for the conduct of NBC reconnaissance.
- Report all information rapidly and accurately.
- Plan for resupply activities to sustain NBC reconnaissance operations.
- Determine possible locations for post-mission decontamination.
- Plan for fire support requirements.
- Plan fratricide prevention measures.
- Establish MEDEVAC procedures.
- Identify NBCWRS procedures and frequencies.

C-7. NBC PROTECTION

NBC protection is an integral part of operations. Techniques that work for avoidance also work for protection (shielding soldiers and units and shaping the battlefield). Other forms of protection involve sealing or hardening positions, protecting soldiers, assuming appropriate MOPP levels (Table C-2), reacting to attack, using pretreatments, barrier creams, and chemoprophylaxis, and using collective protection. Individual protective items include the protective mask, battledress overgarments (BDOs), overboots, and gloves. The corps or higher level commander establishes the minimum level of protection. Subordinate units may increase this level as necessary but may not decrease it. BDOs may be worn for 30 days in an uncontaminated environment or for 24 hours once contaminated.

MOPP Levels

Level / *Equip*	MOPP Ready	MOPP 0	MOPP 1	MOPP 2	MOPP 3	MOPP 4	Mask Only
Mask	Carried	Carried	Carried	Carried	Worn	Worn	Worn***
BDO	Ready*	Avail **	Worn	Worn	Worn	Worn	
Overboots	Ready*	Avail **	Avail **	Worn	Worn	Worn	
Gloves	Ready*	Avail **	Avail **	Avail **	Avail **	Worn	
Helmet Cover	Ready*	Avail **	Avail **	Worn	Worn	Worn	

* Items avail to soldier within 2 hours w/replacement avail within 6 hours
** Items must be positioned within arm's reach of the soldier
*** Never "mask only" if nerve or blister agent is used in AO

Table C-2. MOPP levels.

C-8. DECONTAMINATION

Use of NBC weapons creates unique residual hazards that may require decontamination. In addition to the deliberate use of these weapons, collateral damage, natural disasters,

and industrial emitters may require decontamination. Contamination forces units into protective equipment that degrades performance of individual and collective tasks. Decontamination restores combat power and reduces casualties that may result from exposure, thus allowing commanders to sustain combat operations. Use the four principals of decontamination when planning decontamination operations:

- Decontaminate as soon as possible.
- Decontaminate only what is necessary.
- Decontaminate as far forward as possible (METT-T dependent).
- Decontaminate by priority.

a. The three levels of decontamination are--

(1) ***Immediate Decontamination.*** Immediate decontamination requires minimal planning, and is a basic soldier survival skill. Personal wipedown removes contamination from individual equipment using the M291. For individuals unable to perform self-decontamination, buddy aid decontamination is performed. Operator spraydown uses the on-board decontamination apparatus with DS2 to decontaminate surfaces that an operator must touch or contact to operate the equipment.

(2) ***Operational Decontamination.*** Operational decontamination involves MOPP gear exchange and vehicle spraydown. MOPP gear exchange is most effective when performed within the first six hours of being contaminated; it must be completed within twenty-four hours of being contaminated. Vehicle washdown removes gross contamination and limits the spread of contamination.

(3) ***Thorough Decontamination.*** Thorough decontamination involves detailed troop decontamination (DTD) and detailed equipment decontamination (DED). Thorough decontamination is normally conducted as part of reconstitution or during breaks in combat operations. Support from a chemical decontamination platoon is required.

b. Decontamination planning considerations include the following:

- Plan decontamination sites throughout the width and depth of the sector.
- Tie decontamination sites to the scheme of maneuver and templated NBC strikes.
- Apply the principles of decontamination.
- Plan for contaminated routes.
- Plan logistics and resupply of MOPP, mask parts, water, and decontamination supplies.
- Consider medical concerns, including treatment and evacuation of contaminated casualties.
- Plan for site security.

c. **Patient Decontamination.** Patient decontamination is conducted at the battalion aid station or at the decontamination area. See FM 3-5 and FM 4-02.7 for detailed information. Non-medical personnel perform patient decontamination under medical supervision.